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AUTHOR Frodi, Ann
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ABSTRACT

The present study examined longitudinally the origin of a prior finding that mothers who perceived their infant's temperament as either "easy" or "difficult" exhibited a differential psychophysiological response pattern. Additionally examined were the pattern's behavioral correlates and relation to infant-mother attachment. Participants were 57 Caucasian primiparous mothers of middle to upper middle class background and their healthy infants. Measures included physiological responses to crying, (pre- and post-delivery), child rearing attitudes, Carey's Revised Infant Temperament Questionnaire, observations of feeding and play, and assessment of attachment. Findings indicated that mothers who later rated their own infant as temperamentally "difficult" displayed prior to delivery a pattern of greater physiological arousal in response to an unfamiliar infant's cry and showed more punitive child rearing attitudes. The pattern was similar when mothers' infants were 5 months old, when heart rate responses to their own infant's cry again differentiated the two groups. Few behavioral differences between the two groups were found. All "easy" infants were securely attached to their mothers, whereas a large proportion of the "difficult" infants were anxiously attached. No association was found between maternal temperament ratings and infant characteristics. Variations in mothers' ratings of their infant's temperament are associated not only with concurrent sensitivity to crying but also with response tendencies prior to parenthood. These predispositions appear to affect the development of the infant-mother bond a year later. (Author/RH)

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Maternal responsiveness to infant crying, perceived infant temperament and infant-mother attachment.

presented by Ann Frodi

In my presentation I would like to discuss some data from our recent longitudinal research on maternal responsiveness to infant crying; with an emphasis on its relation to perceived infant temperament and to infant-mother attachment. Lisa Bridges and Susan Shonk were collaborators on this work.

In our previous research we employed a technique assessing psychophysiological responses of adults to a videotape of an infant, who was either quiescent, smiling or crying. We also obtained the subjects' self-reported emotional reactions. Subjects seen in this series of investigations ranged from 8 to 50 years of age and included men and women, parents and nonparents, children and adolescents. The studies demonstrated that the infant cry elicited significant increases in physiological arousal and negative emotional reactions in all listeners as indexed by heart rate, blood pressure and skin conductance responses and self report measures. The smile triggered no arousal and positive feelings. We argued that this basic response pattern may be species-specific and thus independent of gender, age, as well as parenthood.

We did observe some variations in responsiveness, however, related to atypical experience with children. Mothers who perceived their own young infant as temperamentally 'difficult', compared with mothers who

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viewed their own baby as 'easy', exhibited a stronger physiological response to the crying of the stimulus infant on indices of heart rate and blood pressure. Mothers of premature infants responded with greater physiological arousal to the crying than did mothers of term infants. In addition, mothers identified as child abusers displayed more pronounced reactions to both crying and smiling than did mothers who had not abused their children (Frodi & Lamb, 1980).

The expectations of the listeners also influenced their responsiveness to crying. In one study parents of both sexes were more affected physiologically when the stimulus infant, who was a healthy five-month old, was described as atypical rather than normal prior to the viewing.

On the basis of these findings, it was not possible to address the issue of the etiology of the observed variations in responsiveness. One possibility might be that mothers develop a tendency to react with increased aversive physiological arousal to crying as a consequence of unusually difficult transactions (either perceived or real) with their infants. An alternative might be that characteristics in the mothers predispose them toward an exaggerated reactivity to infant demands.

Thus, the major issue addressed in the current investigation concerned the possible origin as well as correlates and effects of variations in cry responsiveness.

Because of our earlier findings, we were particularly interested in the variations in responsiveness of mothers who view their infants as either easy or difficult.

We examined several possible antecedents, for example response

tendencies to infant signals prior to parenthood. We also observed behavioral correlates of variations in responsiveness, and finally relations to infant-mother attachment. We will focus on these issues. However, in addition, we assessed the contribution of infant characteristics - both crying and other behaviors - to maternal perceptions of temperament.

Method

Our subjects were initially 57 Caucasian primiparae of middle to upper middle class background. There was some attrition at each assessment. 45 subjects completed the last assessment. The infants were approximately evenly divided by sex, and all healthy. Mothers ranged in age from 18 to 38 at the time of their infant's birth.

Procedure

The study comprised one pre-delivery laboratory visit, one home visit at infant age 4 months ($\pm$3 weeks) and two laboratory visits at infant age 5 months ($\pm$1 month) and 1 year ($\pm$2 weeks), respectively. I will describe each assessment in some detail.

In the subjects' last trimester of pregnancy they came to the lab where they viewed a 6-minute videotape of a 5 month-old infant. The videotape consisted of 3 segments, each 2 minutes long. In the first and last segments, the infant was seen quiescent, and in the middle segment crying. The sound of the cry was adjusted to reach peaks of 70-75 dB. The subjects' heart rate, skin conductance and blood pressure were recorded in the first and last 30 seconds of each segment, here labeled Q_1, Q_2, C_1, etc, and expressed as change scores. The interval labeled Q_2 served as baseline.

At this time the mothers also completed Tiffany Field's 13-item Child rearing Attitudes Scale which yields scores on a punitive-nonpunitive dimension.

The psychophysiological procedure was repeated at the 5-month lab visit. At this time the mothers whose infants had cried during the home visit (allowing us to record the cries) also heard a 10-second excerpt of their own infant's cry. The subjects' HR was then recorded and analyzed in the 10 seconds following the cry onset.

At the 4-month home visit which was scheduled at a time when the baby was likely to wake up from a nap, the infant was filmed asleep, waking up, and (often) crying. Filming continued while the mother fed and played with the infant for 45-60 minutes. Two research assistants participated in each home visit. One questionnaire was left with the mothers (a revised version of Carey's Infant Temperament Questionnaire), which they filled out and mailed to us. This version has 54 items tapping Carey's 9 dimensions of temperament. The sum of 5 scales yields a score on the Easy-Difficult dimension.

From the video records of the home visit the frequency of 15 maternal behaviors, e.g. kiss, touch, vocalize was recorded in 15 second-intervals, by a pair of coders and later factor analyzed yielding 5 composite maternal scores.

Whenever the infants cried, the number, mean duration of the cries and time to soothe were recorded, as were the mothers latency to respond and type of interventions e.g. vocalize, display affection. The cries of the mothers' own infants were subsequently subjected to acoustic analyses which Barry Lester was kind enough to help me with.

The frequency of five other infant behaviors e.g. fuss, smile was also coded from the videotape and factor analyzed, yielding 2 factors (positive behaviors and fussing.)

At 1 year, the infants and mothers were seen in Ainsworth's Strange Situation and the infants were later classified as securely attached (group B), avoidant (group A), or ambivalent (group C) by a team of trained coders.

RESULTS

MOTHERS OF 'EASY' AND 'DIFFICULT' INFANTS

On the basis of the mothers' responses to the Infant Temperament Questionnaire (ITQ-R), the infants received a score on the 'Easy-Difficult' dimension. Two extreme groups of 10 in each were employed in the analyses. It should be noted, however, that the range of the sample was somewhat restricted with no subjects scoring at the most difficult end of the continuum.

Now let's look at the Pre-delivery assessments

A series of t-test analyses indicated that the expectant mothers who later perceived their infant as 'easy' and those who later saw their baby as 'difficult' did not differ on any demographic variables, plans for substitute child care, or anticipated employment status following childbirth. They did differ, however, in childrearing attitudes with the mothers of 'difficult' babies displaying significantly more punitive childrearing attitudes than those of 'easy' babies.

As can be seen in the Slide the two groups were also significantly different from one another in physiological responsiveness to the crying stimulus infant. Although the groups did not differ in their baseline

values, repeated measures analyses across videotape segments on both the SC and SBP responses yielded significant Group effects. In all instances, the mothers of 'difficult' infants exhibited greater increases in physiological arousal than the mothers of 'easy babies'.

In addition, a repeated measures analysis of HR in the 10 seconds following cry onset yielded a significant Group x Seconds interaction effect. The response of the 'easy' group was an initial deceleration followed by a slight acceleration while the 'difficult' group evinced an acceleratory response.

In sum, expectant mothers who later perceived their own infant as 'difficult' exhibited more punitive childrearing attitudes, and greater physiological arousal in responses to a crying baby as indexed by skin conductance responses, heart rate and systolic blood pressure responses before their infant was born than did expectant mothers who were subsequently to view their infant as 'easy'.

At 5 months, mothers of 'easy' and mothers of 'difficult' babies again differed in their physiological responsiveness to the unfamiliar infant on videotape, as they had prior to delivery.

A repeated measures analysis on both SC and SBP responses yielded significant Group x Segments interaction effects and in the case of SC a Group effect as well. The response of the 'difficult' group was more pronounced, especially in the cry segment.

In addition, the two somewhat reduced groups (N_s = 7 and 5) who heard their own infant also responded differentially to its cry. A repeated measures analysis of HR in the 10 seconds following cry onset yielded a significant Group x Seconds interaction effect, suggesting that

the response of both groups was acceleratory but more pronounced in the easy group.

In sum, mothers of 'difficult' compared to mothers of 'easy' babies again exhibited greater physiological arousal in response to an unfamiliar crying baby. The two groups also differentially responded to the cry of their own infant on the second-by-second HR measure.

Now to the Home observation data

First, we examined those infants in the 'easy' group and those in the 'difficult' group who emitted cries in the mother's presence. A series of t-tests on these reduced groups indicated that there were no significant differences between the two groups of infants on any behavioral characteristics, nor on any acoustic variables.

Similarly, there were no significant differences between the two groups of mothers on any of the home observation measures, either interventions when the baby cried, or non-cry-related measures with one exception: The mothers of 'difficult' compared to 'easy' babies were more likely to respond with play when their baby cried.

Next we turn to relations between perceived temperament and infant-mother attachment. Nine of the infants classified as 'easy' and 7 of the infants classified as 'difficult' were seen in the Strange Situation. All 9 infants in the 'easy' group were classified as securely attached whereas in the 'difficult' group there were 3 avoidant group-A infants, 4 secure group-B infants, but no resistant group-C infants.

A t-test comparing the difficulty scores for secure versus the combined insecure (groups A and C) infants, on the whole sample yielded a significant difference, with the secure infants receiving less difficult

ratings.

Now I'll very briefly mention the last issue, namely the contribution of infant characteristics to maternal perceptions of temperament

To our surprise, correlational analyses on the entire sample indicated no significant relations between temperament ratings and any infant characteristics. These included frequency of crying in the home, mean duration of cries, time to soothe, acoustic variables, and the two composite measures, (positive behaviors and fussing). This finding is perhaps surprising given the emphasis on crying in the description of the 'difficult' child.

Discussion

In sum, when exposed to a videotape of a crying infant in their last trimester of pregnancy, the mothers who were later to rate their own infant as 'difficult' responded with greater increases on three physological measures compared to mothers who later were to perceive their own baby as 'easy'. Mothers of 'difficult' babies also displayed more punitive childrearing attitudes, for example regarding spanking, comforting techniques, the use of TV, and babysitters. Furthermore, there appeared to be no associations between maternal temperament ratings and infant characteristics. Neither measures of amount of crying, time to calm nor acoustic features of their own infant's cry were related to maternal ratings of temperament. These findings suggest to us that mothers' perceptions of their infant's temperament have their origin in physiological predispositions to react aversively to child related stimuli, and in certain beliefs about children, tendencies which exist prior to parenthood. Furthermore, although the mothers of 'easy' and the

mothers of 'difficult' infants showed differential heart rate responses to their own infant's crying played back in the laboratory, the two groups of infants were indistinguishable on observational and acoustic measures. Finally, maternal temperament perceptions were strongly related to the quality of infant-mother attachment. All 'easy' infants were securely attached, whereas almost half of the 'difficult' infants were insecurely attached to their mothers.

I would like to suggest that similar processes may be involved by which mothers perceive their infant's temperament as either 'easy' or 'difficult' and by which they facilitate the development of a secure or insecure attachment relationship. For example, women who prior to parenthood react with an aversive physiological arousal to infant stimuli and espouse views such as leaving a baby to cry itself out may also be relatively insensitive and unempathic in interaction with their own baby, thus fostering an insecure relationship. In line with recent research on internal working models of attachment relationships, I will also speculate that these maternal response tendencies may originate in early life, perhaps in the early relationships the mothers had with their own mothers. Our final analyses showed, however, that the relationship between maternal pre-delivery measures and later attachment is not a direct one but mediated by temperament perceptions.